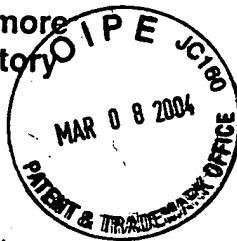


University of California


 Lawrence Livermore  
National Laboratory

 RECEIVED  
 LLNL PATENT GROUP

## RECORD OF INVENTION

 LLNL File No.  
 10560

This invention was made in the course of or under prime Contract No. W-7405-ENG-48 between the U.S. Department of Energy and the University of California. This Record of Invention is prepared for the Office of the Assistant General Counsel for Patents, U.S. Department of Energy.

## I. Title of the Invention

Building Airspace Protection System

 RECEIVED  
 MAR 12 2004

## II. Inventor Information

LLNL Inventor(s) (F M L)	Title/Position	Directorate	Payroll Acct	Phone #	Mail Stop
Raymond P. Mariella Jr.	Engineer	Engineering	9655	2-8905	L-222

Non-LLNL Inventor(s) (F M L)	Title/Position	Employer	Phone #	Fax #	Subcontract #

## III. Abstract

A system is proposed that would protect the occupants of a building or other area with an enclosed airspace from the release of harmful aerosol particles, including pathogens. It would use a continuously-operating, autonomous aerosol sensor followed by a high-performance electrostatic precipitator that would be activated if the sensor detected a potentially harmful substance in the air. This would be similar, in some respect, to a smoke alarm connected to a water sprinkler system - that is, it would sense a threat and eliminate it. The damage to a building's furnishings would be less for the APDS/EP system, however!

## IV. Uses of the Invention

List past uses, current uses and potential uses for your invention

LLNL or Government uses or possibilities for use:

Any populated, enclosed space, which has air supplied through a ventilation duct is a potential application.

Commercial or other uses or possibilities for use:

Any populated, enclosed space, which has air supplied through a ventilation duct is a potential application.

RECORD OF INVENTION

Page 2

LLNL File No. [redacted]

**V. Documents Describing the Invention**

Documents, publications, and presentations describing the invention that you have published or prepared for publication, or presented on the subject. Also include presentations and publications planned within one year from now. Please attach a copy of preprints, articles, or viewgraphs.

Title/Subject	Date	Publication #
Possible Initiated Date (Public Conference) ON [redacted] - PER ATTACHED HANDWRITTEN NOTE	[redacted]	[redacted]

**VI. Documents Describing Prior Art (Please include copies of these documents.)**

Related Documents (including patents, other publications) Please include patent numbers, authors, title, publication date, etc.

[redacted]

**VII. Background**

Background of the invention, including technical problems addressed by it:

For at least 3 years, now, we (at LLNL) have been trying to invent an autonomous pathogen detection system (APDS). This would be used to monitor the air inside of an enclosed airspace that is a gathering area for people - it could be an office building, an event center, or whatever. It would be used to determine if a terrorist were to release an aerosolized pathogen into the ventilation system of a building. We have made good progress, but there has always been a nagging question - what do you recommend as an action, if a real pathogen is detected? Most people will not have a HEPA-filtered mask available (and would not be properly-fitted, trained, etc., for its use, anyway). I have thought for some time that a prophylactic approach could avoid the problem - filter all of the building air supply. This is impractical. While mulling this over (bicycling off-site at noon [redacted]), I thought of another approach that may work. After a few days of pondering, it still sounds OK, so I am writing this disclosure.

**VIII. Invention Description**

Description of the invention (you may also attach a paper). Please include a sketch of the invention, if possible.

Install a large electrostatic precipitator (EP) downstream of the APDS and, upon first warning, switch the EP on! When not activated, the EP would present very little constriction to the overall airflow in the HVAC system of the building, and the maintenance costs would be minimal (perhaps once per year the accumulated deposits might need to be washed off). Moreover, the APDS/EP combination would have one fail-safe property, if the EP were connected to the same electrical circuit as the blower on the HVAC system - if the electricity failed on the EP, so that it could not trap the pathogen, the blower would not be pushing the pathogen towards the people, either. Such a system would have the added feature that it would archive the sample for later analysis, although viability might not be maintained. The APDS could determine this from its more gentle capture process, anyway, at its leisure, since the people would not be being exposed while it was performing the viability assay.

## RECORD OF INVENTION

Page 4

LLNL File No. [Redacted]

### IX. Inventor Information

Inventor's Permanent Home Address (Please attach a separate sheet for additional inventors.)

Full Name	Citizenship	Street Address	City, State, Zip Code
Raymond P. Mariella Jr.	USA	872 El Quanito Ct.	Danville, CA 94526

### X. Funding Source

Funding Source or Project Under Which the Invention Arose (Include subcontracts, CRADAs, international agreements, work for others, or special project information.):

#### Engineering - AD's Office

Resource Manager	Phone #	Is funding presently being provided for development of your invention?	Yes	No
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
LLNL Acct #	B&R #	Please state the source of funds (if same as above, please so state):		
4398-10	N/A	[Redacted]		
Subcontract #	DOE Program Code	Do you reasonably expect future funding from the current source or other sources? Yes No		
CRADA #	Work for Others #	If yes, what is that source?		

### XI. Conception of the Invention

Conception Date	Conception Place		
noon, [Redacted]	off-site, near LLNL		
Earliest documentation of your invention (please provide date and identify the document):		First Sketch or Drawing Date	First Written Description Date
Names of Witnesses or others with knowledge of facts relating to conception (preferably at least 2):			
Full Name	Organization	Telephone Number	
Robin Miles	Engineering	422-5048	

### XII. Reduction To Practice of the Invention

Date first model completed	Date of operation and testing	Place of test
Results of testing:		
Witnesses or others with direct knowledge of test (preferably at least 2):		
Full Name	Organization	Telephone Number

LLNL File No.

**XIII. Invention Use and Disclosure**

Has the invention been put into use?	Yes	No	If yes, explain:
Has the invention been disclosed to non-LLNL personnel?	Yes	No	If yes, to whom and when? Provide name(s) and date(s):
If yes, was the disclosure done under a non-disclosure agreement?	Yes	No	

**XIV. I/We believe myself/ourselves to be the first and original inventor(s) of the above-described invention.**

Inventor Signature	Date	Witness Signature	Date
<i>Raymond P. Mansell Jr.</i>		<i>J. A. Miller</i>	

**XV. Classification Review**

Basis for unclassified release:		
<input checked="" type="checkbox"/>	Outside scope of AEA and EO	
<input type="checkbox"/>	CG-DAR-1, Topic(s):	
<input type="checkbox"/>	Other Guide(s):	
Topic(s):		
UCNI	Yes	No
If YES, Guide:		
<input type="checkbox"/>		

Authorized Derivative Classifier – Name and Title	Signature
<i>Joseph R. Miller</i>	<i>Joseph R. Miller</i>
Confirming Reviewer – Name	Signature
<i>Wm. A. Bollinger</i>	<i>Wm. A. Bollinger</i>

**XVI. For LLNL Patent Group Use Only**

Possible Statutory Bars

Publication	
Public Use/Sale	
Recommended Filing Date Due to Possible Statutory Bars	
Preliminary Review By:	Date

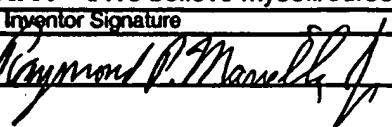
Send the completed and signed form to the Patent Group at L-703

LLNL File No.

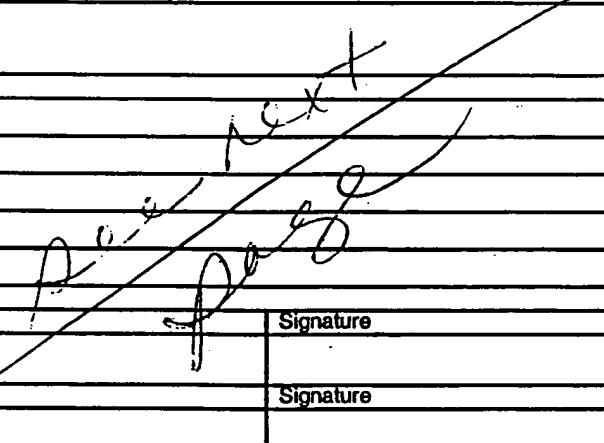
**XIII. Invention Use and Disclosure**

Has the invention been put into use?	Yes	No	If yes, explain:
Has the invention been disclosed to non-LLNL personnel?	Yes	No	If yes, to whom and when? Provide name(s) and date(s):
If yes, was the disclosure done under a non-disclosure agreement?	Yes	No	

**XIV. We believe myself/ourselves to be the first and original inventor(s) of the above-described invention.**

Inventor Signature	Date	Witness Signature	Date
	[REDACTED]		[REDACTED]

**XV. Classification Review**

Basis for unclassified release:			
Outside scope of AEA and EO			
CG-DAR-1, Topic(s):			
Other Guide(s):			
Topic(s):			
UCNI	Yes	No	If YES, Guide:
			
Authorized Derivative Classifier - Name and Title		Signature	
Confirming Reviewer - Name		Signature	

**XVI. For LLNL Patent Group Use Only**

Possible Statutory Bars

Publication	
Public Use/Sale	
Recommended Filing Date Due to Possible Statutory Bars	
Preliminary Review By:	Date

Send the completed and signed form to the Patent Group at L-703